



# AIR RESOURCES LABORATORY SEMINAR

## Air Mass Recognition via Chemical Analysis

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Atmospheric particles were collected with time resolutions of 1 to 1.5 hours at Loyola University Chicago's Air Monitoring Station and during the Phoenix sunrise experiment June 2001. The digested and/or extracted samples were analyzed using total reflection X-ray fluorescence (TXRF) for trace elemental content and ion chromatography (IC) for anions and cations. With TXRF elemental concentrations of less than  $1\text{ ng/m}^3$  could be detected quantitatively due to the high detection power of the instrument and the micro analytical feature of the technique.

The results obtained showed that air masses and air mass changes can be identified with respect to their chemical fingerprints very accurately when using these high temporal resolutions. Simultaneous recording of basic meteorological parameters such as wind direction and wind speed aided to the identification of air masses together with back trajectory calculation using the National Oceanographic and Atmospheric Administrations HYSPLIT\_4 (Hybrid Single-Particle Lagrangian Integrated Trajectory) model.

In Chicago it was possible to distinguish between three major air mass types: clean air from Lake Michigan, polluted air traveling across major parts of the city thus showing a distinct anthropogenic influenced elemental spectrum and soil dust laden air having its origin in the Great Plains. Even slight changes in an air mass pattern like partial take up of pollution from the eastern (Michigan) shore line of Lake Michigan could be clearly identified.

11:00A, Thursday, October 17, 2002  
SSMC3, Rm. 3404  
1315 East-West Hwy., Silver Spring, MD

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